5.4 and 5.5 Quiz Review

Name Key

1. Use the sum and difference formulas to find cos (π/6 + π/3)

$$\cos(\tfrac{\pi}{6})\cos(\tfrac{\pi}{3}) - \sin(\tfrac{\pi}{6})\sin(\tfrac{\pi}{3})$$

$$\frac{\sqrt{3}}{2}\cdot\frac{1}{2} - \frac{1}{2}\cdot\frac{\sqrt{3}}{2} = \frac{\sqrt{3}}{4} - \frac{\sqrt{3}}{4} = \boxed{0}$$

2. Use the sum and difference formulas to find sin(7π/6 – π/3).

$$\sin(\tfrac{7\pi}{6})\cos(\tfrac{\pi}{3}) - \cos(\tfrac{7\pi}{6})\sin(\tfrac{\pi}{3})$$

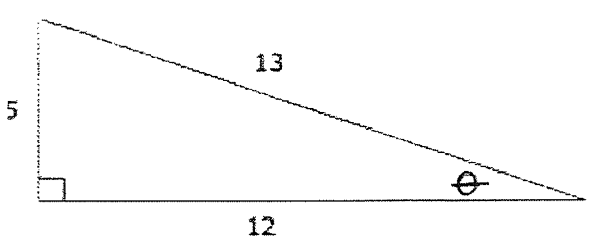
$$-\frac{1}{2}\cdot\frac{1}{2} - \frac{-\sqrt{3}}{2}\cdot\frac{\sqrt{3}}{2} = -\frac{1}{4} + \frac{3}{4} = \frac{2}{4} = \boxed{\frac{1}{2}}$$

3. Use the sum and difference formulas to find tan (135°+30°).

$$\frac{\tan 135 + \tan 30}{1 - \tan 135 \tan 30} = \frac{-1+\frac{\sqrt{3}}{3}}{1-(-1)(\frac{\sqrt{3}}{3})} = \frac{(-1+\frac{\sqrt{3}}{3})(1-\frac{\sqrt{3}}{3})}{(1+\frac{\sqrt{3}}{3})(1-\frac{\sqrt{3}}{3})} = \frac{-1+\frac{\sqrt{3}}{3}+\frac{\sqrt{3}}{3}-\frac{1}{3}}{1-\frac{\sqrt{3}}{3}+\frac{\sqrt{3}}{3}-\frac{1}{3}} =$$

$$\frac{-\frac{4}{3}+\frac{2\sqrt{3}}{3}}{\frac{2}{3}} = \frac{-4+2\sqrt{3}}{\cancel{3}}\cdot\frac{\cancel{3}}{2} = \boxed{-2+\sqrt{3}}$$

Use the figure below and the Double and Half Angle Formulas to find the following values.



4. Sin θ $= \frac{O}{H} = \boxed{\frac{5}{13}}$

5. Cos (θ/2) $= \sqrt{\frac{1+\frac{12}{13}}{2}} = \sqrt{\frac{\frac{25}{13}}{2}} = \sqrt{\frac{25}{26}} = \frac{5}{\sqrt{26}} = \frac{5\sqrt{26}}{26}$

6. Sin 2θ $= 2\cdot\frac{5}{13}\cdot\frac{12}{13} = \frac{120}{169}$

7. tan 2θ $= \frac{2\cdot\frac{5}{12}}{1-(\frac{5}{12})^2} = \frac{\frac{10}{12}}{1-\frac{25}{144}} = \frac{\frac{10}{12}}{\frac{144}{144}-\frac{25}{144}} = \frac{\frac{10}{12}}{\frac{119}{144}} = \frac{10}{\cancel{12}}\cdot\frac{\cancel{144}^{12}}{119} = \frac{120}{119}$

8. Use the product to sum formula to write the expression as a sum or difference.

Cos2θCos4θ

$\frac{1}{2}\left[\cos(2\theta+4\theta) + \cos(2\theta-4\theta)\right]$

$\frac{1}{2}\left[\cos(6\theta)+\cos(-2\theta)\right]$

$\frac{1}{2}\left[\cos(6\theta)+\cos(2\theta)\right]$

$\frac{1}{2}\cos(6\theta) + \frac{1}{2}\cos(2\theta)$

9. Use the sum to product formulas to write the expression as a product.

Cos 2x – Cos 6x

$-2\sin\left(\frac{2x+6x}{2}\right)\sin\left(\frac{2x-6x}{2}\right)$

$-2\sin(4x)\sin(-2x)$

$2\sin(4x)\sin(2x)$

10. Use double-angle formulas to verify the identity algebraically.

6 sin x cos x = 3 sin 2x

$6\sin x\cos x = 3(2\sin x\cos x)$

✓ $6\sin x\cos x = 6\sin x\cos x$